

January 4, 2013

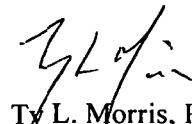
Mr. Jason Gunter
Remedial Project Manager
U.S. Environmental Protection Agency
Region 7 - Superfund Branch
901 North 5th Street
Kansas City, KS 66101

Re: The Doe Run Company – Elvins/Rivermines Mine Tailings Site Monthly Progress Report

Dear Mr. Gunter:

As required by Article VI, Section 56 of the Unilateral Administrative Order (UAO) (CERCLA-07-2005-0169) for the referenced project and on behalf of The Doe Run Company, the progress report for the period November 1, 2012 through November 30, 2012 is enclosed. If you have any questions or comments, please call me at 573-638-5020 or Mark Nations at 573-518-0800.

Sincerely,



Ty L. Morris, P.E., R.G.
Vice President

TLM/jms
Enclosures
c: Mark Nations – TDRC
Matt Wohl – TDRC (electronic only)
Kathy Rangen – MDNR
Tim Skoglund – Barr Engineering

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Superfund

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Elvins/Rivermines Mine Tailings Site
Park Hills, Missouri
Removal Action - Monthly Progress Report
Period: November 1, 2012 – November 30, 2012

1. Actions Performed and Problems Encountered This Period:

- a. Continued operating the roughing filter during the period and divert flow around the ZVI/sand filter, aeration tank, and final sand filter.
- b. Continued to take analytical samples from the pilot test roughing filter (RMP-Rough) during the period. Samples were taken two to three times a week. Typically these samples were taken from the syphon hose except for the sampling events on November 2, 2012, November 5, 2012, November 28, 2012, and November 30, 2012 when the samples were taken from the bypass pipe. Analytical results are described below and included with this progress report.
- c. Continued to have head loss issues within the roughing filter and its associated piping system. This is primarily occurring as a result of the metal sulfides that have been deposited in the system as a result of the treatment process. The system was back-flushed on November 6, 2012. This provided temporary improvements to the head loss issues, but by the end of the period the head losses began to increase again.
- d. Continued efforts to bench test possible renovations to the iron/sand filter and system piping.
- e. Work continued on the task of rehabilitating the western treatment pond. This work focused on mixing and installing the organic media. As of the end of the period, this work had been completed.
- f. Upon completing work on mixing and placing the organic media, work began on the task of constructing the distribution system. As of the end of the period, work on this task had also been completed. Once the distribution system had been constructed, the pond was filled with water to allow the media to saturate. No flow will be allowed in or out of the pond for the next few weeks to give the media time to activate.

2. Analytical Data and Results Received This Period:

- a. Dissolved zinc levels in the pilot effluent test ranged between 0.004 mg/L and 4.223 mg/L. The increase in levels occurred gradually throughout the month.
- b. Total zinc levels in the pilot test effluent ranged between 2.67 mg/L and 7.20 mg/L. The increase in levels occurred gradually throughout the month.
- c. Iron concentrations in the pilot test effluent ranged between 0.82 mg/L and 2.09 mg/L.
- d. Total suspended solids concentrations in the system effluent were measured at 8.0 mg/l on November 2, 2012 and 7.5 mg/l on November 5, 2012.
- e. During this period, water samples were collected from just upstream of Old Missouri Highway 32, as well as from upstream and downstream of the confluence of the site discharge with Flat River. The analytical results for this event are included in this progress report.
- f. During this period, the Ambient Air Monitoring Report for August 2012 was received. Any issues identified in this report are discussed below. A copy of this document has been sent to your attention.

The August 2012 Ambient Air Monitoring Report noted the following:

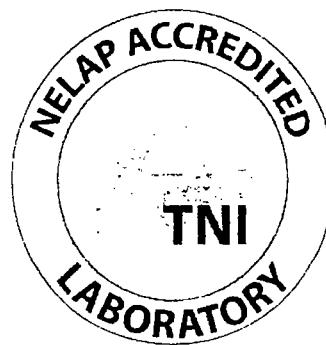
- The action levels for lead and dust were not exceeded.
- A QA filter blank was completed on the Rivermines #1 (Office) TSP and PM₁₀ monitors on 08/30/12.

- 3. Developments Anticipated and Work Scheduled for Next Period:**
 - a. Continue analytical sampling and field measurements three times a week. No WET tests are planned.
 - b. Continue to operate the system with the bypass pipe.
 - c. Complete monthly water sampling activities as described in the Removal Action Work Plan.
 - d. Complete air monitoring activities as described in the Removal Action Work Plan.
 - e. Continue bench testing secondary treatment options that could be added to the roughing filter of the pilot test.
 - f. Continue renovations to the western treatment pond. Water will sit in the cell allowing the media to activate for a couple weeks. At the end of that time frame, flow through the cell will be resumed at a significantly reduced flow rate. This flow rate will be increased over time until normal operating capacity is reached.
- 4. Changes in Personnel:**
 - a. None.
- 5. Issues or Problems Arising This Period:**
 - a. None.
- 6. Resolution of Issues or Problems Arising This Period:**
 - a. None.

End of Monthly Progress Report

November 27, 2012

Allison Olds
Barr Engineering Company
1001 Diamond Ridge
Suite 1100
Jefferson City, MO 65109
TEL: (573) 638-5007
FAX: (573) 638-5001



RE: River Mines MTS/25/86-0009

WorkOrder: 12110726

Dear Allison Olds:

TEKLAB, INC received 4 samples on 11/15/2012 2:25:00 PM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report, Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,



Michael L. Austin
Project Manager
(618)344-1004 ex 16
MAustin@teklabinc.com

Report Contents

<http://www.teklabinc.com/>

Client: Barr Engineering Company

Work Order: 12110726

Client Project: River Mines MTS/25/86-0009

Report Date: 27-Nov-12

This reporting package includes the following:

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Definitions

<http://www.teklabinc.com/>

Client: Barr Engineering Company
Client Project: River Mines MTS/25/86-0009

Work Order: 12110726
Report Date: 27-Nov-12

Abbr Definition

CCV Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.

DF Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilutions factors.

DNI Did not ignite

DUP Laboratory duplicate is an aliquot of a sample taken from the same container under laboratory conditions for independent processing and analysis independently of the original aliquot.

ICV Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.

IDPH IL Dept. of Public Health

LCS Laboratory control sample, spiked with verified known amounts of analytes, is analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system. The acceptable recovery range is in the QC Package (provided upon request).

LCSD Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).

MB Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.

MDL Method detection limit means the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

MS Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).

MSD Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).

MW Molecular weight

ND Not Detected at the Reporting Limit

NELAP NELAP Accredited

PQL Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions. The acceptable recovery range is listed in the QC Package (provided upon request).

RL The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.

RPD Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).

SPK The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.

Surrogate Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.

TNTC Too numerous to count (> 200 CFU)

Qualifiers

- Unknown hydrocarbon

B - Analyte detected in associated Method Blank

E - Value above quantitation range

H - Holding times exceeded

M - Manual Integration used to determine area response

ND - Not Detected at the Reporting Limit

R - RPD outside accepted recovery limits

S - Spike Recovery outside recovery limits

X - Value exceeds Maximum Contaminant Level

Client: Barr Engineering Company

Work Order: 12110726

Client Project: River Mines MTS/25/86-0009

Report Date: 27-Nov-12

Cooler Receipt Temp: 5.6 °C

Locations and Accreditations

Collinsville		Springfield		Kansas City	
Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425	Address	3920 Pintail Dr Springfield, IL 62711-9415	Address	8421 Nieman Road Lenexa, KS 66214
Phone	(618) 344-1004	Phone	(217) 698-1004	Phone	(913) 541-1998
Fax	(618) 344-1005	Fax	(217) 698-1005	Fax	(913) 541-1998
Email	jhriley@teklabinc.com	Email	KKlostermann@teklabinc.com	Email	dthompson@teklabinc.com

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2013	Collinsville
Kansas	KDHE	E-10374	NELAP	1/31/2013	Collinsville
Louisiana	LDEQ	166493	NELAP	6/30/2013	Collinsville
Louisiana	LDEQ	166578	NELAP	6/30/2013	Springfield
Texas	TCEQ	T104704515-12-1	NELAP	7/31/2013	Collinsville
Arkansas	ADEQ	88-0966		3/14/2013	Collinsville
Illinois	IDPH	17584		4/30/2013	Collinsville
Kentucky	UST	0073		5/26/2013	Collinsville
Missouri	MDNR	00930		4/13/2013	Collinsville
Oklahoma	ODEQ	9978		8/31/2013	Collinsville

Laboratory Results

<http://www.teklabinc.com/>
Client: Barr Engineering Company

Work Order: 12110726

Client Project: River Mines MTS/25/86-0009

Report Date: 27-Nov-12

Lab ID: 12110726-001

Client Sample ID: RM-001

Matrix: AQUEOUS

Collection Date: 11/14/2012 13:00

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	200		937	mg/L	20	11/21/2012 1:16	R170781
STANDARD METHOD 4500-H B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		7.59		1	11/16/2012 8:36	R170567
STANDARD METHODS 2340 C								
Hardness, as (CaCO ₃)	NELAP	5		1130	mg/L	1	11/16/2012 14:07	R170603
STANDARD METHODS 2540 D								
Total Suspended Solids	NELAP	6		< 6	mg/L	1	11/15/2012 18:02	R170561
STANDARD METHODS 2540 F								
Solids, Settleable	NELAP	0.1		< 0.1	ml/L	1	11/15/2012 17:00	R170564
STANDARD METHODS 5310 C, ORGANIC CARBON								
Total Organic Carbon (TOC)	NELAP	1.0		2.4	mg/L	1	11/16/2012 14:48	R170625
EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)								
Cadmium	NELAP	2.00		12.1	µg/L	1	11/20/2012 11:52	83483
Zinc	NELAP	10.0	S	16900	µg/L	1	11/20/2012 11:52	83483
<i>MS QC limits for Zn are not applicable due to high sample/spike ratio.</i>								
EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)								
Cadmium	NELAP	2.00		13.3	µg/L	1	11/20/2012 0:33	83461
Zinc	NELAP	10.0		16500	µg/L	1	11/20/2012 0:33	83461
STANDARD METHODS 3030 E, 3113 B, METALS BY GFAA								
Lead	NELAP	10.0	X	24.8	µg/L	5	11/16/2012 11:18	83432
STANDARD METHODS 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)								
Lead	NELAP	10.0	X	16.0	µg/L	5	11/16/2012 14:51	83435

Laboratory Results

<http://www.teklabinc.com/>

Client: Barr Engineering Company

Work Order: 12110726

Client Project: River Mines MTS/25/86-0009

Report Date: 27-Nov-12

Lab ID: 12110726-002

Client Sample ID: RM-DUP

Matrix: AQUEOUS

Collection Date: 11/14/2012 12:15

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	20		41	mg/L	2	11/26/2012 23:05	R170881
STANDARD METHOD 4500-H B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		7.89		1	11/16/2012 8:39	R170567
STANDARD METHODS 2340 C								
Hardness, as (CaCO ₃)	NELAP	5		160	mg/L	1	11/16/2012 14:07	R170603
STANDARD METHODS 2540 D								
Total Suspended Solids	NELAP	6		< 6	mg/L	1	11/15/2012 18:11	R170561
STANDARD METHODS 5310 C, ORGANIC CARBON								
Total Organic Carbon (TOC)	NELAP	1.0		3.0	mg/L	1	11/16/2012 14:54	R170625
EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)								
Cadmium	NELAP	2.00		< 2.00	µg/L	1	11/20/2012 12:11	83483
Zinc	NELAP	10.0		< 10.0	µg/L	1	11/20/2012 12:11	83483
EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)								
Cadmium	NELAP	2.00		< 2.00	µg/L	1	11/20/2012 0:39	83461
Zinc	NELAP	10.0		< 10.0	µg/L	1	11/20/2012 0:39	83461
STANDARD METHODS 3030 E, 3113 B, METALS BY GFAA								
Lead	NELAP	2.00		< 2.00	µg/L	1	11/16/2012 11:28	83432
STANDARD METHODS 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)								
Lead	NELAP	2.00		< 2.00	µg/L	1	11/16/2012 10:16	83435

Laboratory Results

<http://www.teklabinc.com/>
Client: Barr Engineering Company

Work Order: 12110726

Client Project: River Mines MTS/25/86-0009

Report Date: 27-Nov-12

Lab ID: 12110726-003

Client Sample ID: RM-US

Matrix: AQUEOUS

Collection Date: 11/14/2012 12:10

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	20		33	mg/L	2	11/21/2012 1:34	R170781
STANDARD METHOD 4500-H B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		7.88		1	11/16/2012 8:41	R170567
STANDARD METHODS 2340 C								
Hardness, as (CaCO ₃)	NELAP	5		180	mg/L	1	11/16/2012 14:07	R170603
STANDARD METHODS 2540 D								
Total Suspended Solids	NELAP	6		< 6	mg/L	1	11/15/2012 18:11	R170561
STANDARD METHODS 5310 C, ORGANIC CARBON								
Total Organic Carbon (TOC)	NELAP	1.0		3.1	mg/L	1	11/16/2012 15:01	R170625
EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)								
Cadmium	NELAP	2.00		< 2.00	µg/L	1	11/20/2012 12:14	83483
Zinc	NELAP	10.0		< 10.0	µg/L	1	11/20/2012 12:14	83483
EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)								
Cadmium	NELAP	2.00		< 2.00	µg/L	1	11/20/2012 0:57	83461
Zinc	NELAP	10.0		< 10.0	µg/L	1	11/20/2012 0:57	83461
STANDARD METHODS 3030 E, 3113 B, METALS BY GFAA								
Lead	NELAP	2.00		< 2.00	µg/L	1	11/16/2012 11:32	83432
STANDARD METHODS 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)								
Lead	NELAP	2.00		< 2.00	µg/L	1	11/16/2012 10:20	83435



Laboratory Results

<http://www.teklabinc.com/>

Client: Barr Engineering Company

Work Order: 12110726

Client Project: River Mines MTS/25/86-0009

Report Date: 27-Nov-12

Lab ID: 12110726-004

Client Sample ID: RM-DS

Matrix: AQUEOUS

Collection Date: 11/14/2012 11:45

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	50	S	68	mg/L	5	11/21/2012 1:40	R170781
MS and/or MSD did not recover within control limits due to matrix interference.								
STANDARD METHOD 4500-H B, LABORATORY ANALYZED								
Lab pH	NELAP	1.00		7.84		1	11/16/2012 8:43	R170567
STANDARD METHODS 2340 C								
Hardness, as (CaCO ₃)	NELAP	5		190	mg/L	1	11/16/2012 14:07	R170603
STANDARD METHODS 2540 D								
Total Suspended Solids	NELAP	6		< 6	mg/L	1	11/15/2012 18:11	R170561
STANDARD METHODS 5310 C, ORGANIC CARBON								
Total Organic Carbon (TOC)	NELAP	1.0		3.1	mg/L	1	11/16/2012 15:07	R170625
EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)								
Cadmium	NELAP	2.00		< 2.00	µg/L	1	11/20/2012 12:18	83483
Zinc	NELAP	10.0		361	µg/L	1	11/20/2012 12:18	83483
EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)								
Cadmium	NELAP	2.00		< 2.00	µg/L	1	11/20/2012 1:03	83461
Zinc	NELAP	10.0		372	µg/L	1	11/20/2012 1:03	83461
STANDARD METHODS 3030 E, 3113 B, METALS BY GFAA								
Lead	NELAP	2.00		2.40	µg/L	1	11/16/2012 11:42	83432
STANDARD METHODS 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)								
Lead	NELAP	2.00		< 2.00	µg/L	1	11/16/2012 10:23	83435



Sample Summary

<http://www.teklabinc.com/>

Client: Barr Engineering Company

Work Order: 12110726

Client Project: River Mines MTS/25/86-0009

Report Date: 27-Nov-12

Lab Sample ID	Client Sample ID	Matrix	Fractions	Collection Date
12110726-001	RM-001	Aqueous	5	11/14/2012 13:00
12110726-002	RM-DUP	Aqueous	5	11/14/2012 12:15
12110726-003	RM-US	Aqueous	5	11/14/2012 12:10
12110726-004	RM-DS	Aqueous	5	11/14/2012 11:45

Client: Barr Engineering Company

Work Order: 12110726

Client Project: River Mines MTS/25/86-0009

Report Date: 27-Nov-12

Sample ID	Client Sample ID	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	Test Name				
12110726-001A	RM-001	11/14/2012 13:00	11/15/2012 14:25		
	Standard Methods 2540 F				11/15/2012 17:00
12110726-001B	RM-001	11/14/2012 13:00	11/15/2012 14:25		
	EPA 600 375.2 Rev 2.0 1993 (Total)				11/21/2012 1:16
	Standard Method 4500-H B, Laboratory Analyzed				11/16/2012 8:36
	Standard Methods 2340 C				11/16/2012 14:07
	Standard Methods 2540 D				11/15/2012 18:02
12110726-001C	RM-001	11/14/2012 13:00	11/15/2012 14:25		
	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)			11/16/2012 14:26	11/20/2012 0:33
	Standard Methods 3030 E, 3113 B, Metals by GFAA			11/15/2012 16:53	11/16/2012 11:18
12110726-001D	RM-001	11/14/2012 13:00	11/15/2012 14:25		
	EPA 600 4.1.1, 200.7R4.4, Metals by ICP (Dissolved)			11/19/2012 8:36	11/20/2012 11:52
	Standard Methods 3030 B, 3113 B, Metals by GFAA (Dissolved)			11/15/2012 20:25	11/16/2012 14:51
12110726-001E	RM-001	11/14/2012 13:00	11/15/2012 14:25		
	Standard Methods 5310 C, Organic Carbon				11/16/2012 14:48
12110726-002A	RM-DUP	11/14/2012 12:15	11/15/2012 14:25		
	Standard Method 4500-H B, Laboratory Analyzed				11/16/2012 8:39
	Standard Methods 2340 C				11/16/2012 14:07
	Standard Methods 2540 D				11/15/2012 18:11
12110726-002B	RM-DUP	11/14/2012 12:15	11/15/2012 14:25		
	EPA 600 375.2 Rev 2.0 1993 (Total)				11/26/2012 23:05
12110726-002C	RM-DUP	11/14/2012 12:15	11/15/2012 14:25		
	EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)			11/16/2012 14:26	11/20/2012 0:39
	Standard Methods 3030 E, 3113 B, Metals by GFAA			11/15/2012 16:53	11/16/2012 11:28
12110726-002D	RM-DUP	11/14/2012 12:15	11/15/2012 14:25		
	EPA 600 4.1.1, 200.7R4.4, Metals by ICP (Dissolved)			11/19/2012 8:36	11/20/2012 12:11
	Standard Methods 3030 B, 3113 B, Metals by GFAA (Dissolved)			11/15/2012 20:25	11/16/2012 10:16
12110726-002E	RM-DUP	11/14/2012 12:15	11/15/2012 14:25		
	Standard Methods 5310 C, Organic Carbon				11/16/2012 14:54
12110726-003A	RM-US	11/14/2012 12:10	11/15/2012 14:25		
	Standard Method 4500-H B, Laboratory Analyzed				11/16/2012 8:41
	Standard Methods 2340 C				11/16/2012 14:07
	Standard Methods 2540 D				11/15/2012 18:11
12110726-003B	RM-US	11/14/2012 12:10	11/15/2012 14:25		
	EPA 600 375.2 Rev 2.0 1993 (Total)				11/21/2012 1:34
12110726-003C	RM-US	11/14/2012 12:10	11/15/2012 14:25		

Client: Barr Engineering Company

Work Order: 12110726

Client Project: River Mines MTS/25/86-0009

Report Date: 27-Nov-12

Sample ID	Client Sample ID	Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
		EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)			11/16/2012 14:26	11/20/2012 0:57
		Standard Methods 3030 E, 3113 B, Metals by GFAA			11/15/2012 16:53	11/16/2012 11:32
12110726-003D	RM-US		11/14/2012 12:10	11/15/2012 14:25		
		EPA 600 4.1.1, 200.7R4.4, Metals by ICP (Dissolved)			11/19/2012 8:36	11/20/2012 12:14
		Standard Methods 3030 B, 3113 B, Metals by GFAA (Dissolved)			11/15/2012 20:25	11/16/2012 10:20
12110726-003E	RM-US		11/14/2012 12:10	11/15/2012 14:25		
		Standard Methods 5310 C, Organic Carbon				11/16/2012 15:01
12110726-004A	RM-DS		11/14/2012 11:45	11/15/2012 14:25		
		Standard Method 4500-H B, Laboratory Analyzed				11/16/2012 8:43
		Standard Methods 2340 C				11/16/2012 14:07
		Standard Methods 2540 D				11/15/2012 18:11
12110726-004B	RM-DS		11/14/2012 11:45	11/15/2012 14:25		
		EPA 600 375.2 Rev 2.0 1993 (Total)				11/21/2012 1:40
12110726-004C	RM-DS		11/14/2012 11:45	11/15/2012 14:25		
		EPA 600 4.1.4, 200.7R4.4, Metals by ICP (Total)			11/16/2012 14:26	11/20/2012 1:03
		Standard Methods 3030 E, 3113 B, Metals by GFAA			11/15/2012 16:53	11/16/2012 11:42
12110726-004D	RM-DS		11/14/2012 11:45	11/15/2012 14:25		
		EPA 600 4.1.1, 200.7R4.4, Metals by ICP (Dissolved)			11/19/2012 8:36	11/20/2012 12:18
		Standard Methods 3030 B, 3113 B, Metals by GFAA (Dissolved)			11/15/2012 20:25	11/16/2012 10:23
12110726-004E	RM-DS		11/14/2012 11:45	11/15/2012 14:25		
		Standard Methods 5310 C, Organic Carbon				11/16/2012 15:07

Client: Barr Engineering Company

Work Order: 12110726

Client Project: River Mines MTS/25/86-0009

Report Date: 27-Nov-12

EPA 600 375.2 REV 2.0 1993 (TOTAL)

Batch R170781 SampType: MBLK		Units mg/L		Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed	
SampID: MBLK														
Sulfate		10					< 10							11/20/2012

Batch R170781 SampType: LCS		Units mg/L		Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
SampID: LCS													
Sulfate		10					21	20	0	106.1	90	110	11/20/2012

Batch R170781 SampType: MS		Units mg/L		Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
SampID: 12110726-004BMS													
Sulfate		50					115	50	68.31	94.1	90	110	11/21/2012

Batch R170781 SampType: MSD		Units mg/L		Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Limit 10		Date Analyzed
SampID: 12110726-004BMSD													
Sulfate		50	S				110	50	68.31	82.8	115.4	5.05	11/21/2012

Batch R170881 SampType: MBLK		Units mg/L		Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
SampID: MBLK													
Sulfate		10					< 10						11/26/2012

Batch R170881 SampType: LCS		Units mg/L		Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
SampID: LCS													
Sulfate		10					21	20	0	103.6	90	110	11/26/2012

STANDARD METHOD 4500-H B, LABORATORY ANALYZED		Units		Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Batch R170567 SampType: LCS													
SampID: LCS		1.00					6.98	7.00	0	99.7	99.1	100.8	11/16/2012

Batch R170567 SampType: DUP		Units		Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Limit 10		Date Analyzed
SampID: 12110726-001BDUP													
Lab pH		1.00					7.62				7.590	0.39	11/16/2012

Client: Barr Engineering Company

Work Order: 12110726

Client Project: River Mines MTS/25/86-0009

Report Date: 27-Nov-12

STANDARD METHOD 4500-H B, LABORATORY ANALYZED

Batch	R170567	SampType:	DUP	Units	RPD Limit 10								
Analyses					RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
			Lab pH	1.00			7.88				7.890	0.13	11/16/2012

Batch	R170567	SampType:	DUP	Units	RPD Limit 10								
Analyses					RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
			Lab pH	1.00			7.88				7.880	0.00	11/16/2012

Batch	R170567	SampType:	DUP	Units	RPD Limit 10								
Analyses					RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
			Lab pH	1.00			7.87				7.840	0.38	11/16/2012

STANDARD METHODS 2340 C

Batch	R170603	SampType:	MBLK	Units mg/L	RPD Limit 10								
Analyses					RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
			Hardness, as (CaCO ₃)	5			< 5						11/16/2012

Batch	R170603	SampType:	LCS	Units mg/L	RPD Limit 10								
Analyses					RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
			Hardness, as (CaCO ₃)	5			1000	1000	0	100.0	90	110	11/16/2012

Batch	R170603	SampType:	MS	Units mg/L	RPD Limit 10								
Analyses					RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
			Hardness, as (CaCO ₃)	5			390	200	190.0	100.0	85	115	11/16/2012

Batch	R170603	SampType:	MSD	Units mg/L	RPD Limit 10								
Analyses					RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
			Hardness, as (CaCO ₃)	5			400	200	190.0	105.0	390.0	2.53	11/16/2012

STANDARD METHODS 2540 D

Batch	R170561	SampType:	MBLK	Units mg/L	RPD Limit 10								
Analyses					RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
			Total Suspended Solids	6			< 6						11/15/2012

Client: Barr Engineering Company

Work Order: 12110726

Client Project: River Mines MTS/25/86-0009

Report Date: 27-Nov-12

STANDARD METHODS 2540 D

Batch	R170561	SampType:	LCS	Units	mg/L						Date Analyzed
SampID:	LCS										
Analyses		RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Total Suspended Solids		6		92	100	0	92.0	85	115		11/15/2012
Total Suspended Solids		6		90	100	0	90.0	85	115		11/15/2012
Total Suspended Solids		6		98	100	0	98.0	85	115		11/15/2012
Total Suspended Solids		6		94	100	0	94.0	85	115		11/15/2012
Total Suspended Solids		6		94	100	0	94.0	85	115		11/15/2012

Batch	R170561	SampType:	DUP	Units	mg/L	RPD Limit	15			
SampID:	12110726-002A	DUP								
Analyses		RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Suspended Solids		6		< 6				0	0.00	11/15/2012

STANDARD METHODS 5310 C, ORGANIC CARBON

Batch	R170625	SampType:	MBLK	Units	mg/L						Date Analyzed
SampID:	CCB										
Analyses		RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Total Organic Carbon (TOC)		1.0		< 1.0							11/16/2012

Batch	R170625	SampType:	LCS	Units	mg/L						Date Analyzed
SampID:	CCV										
Analyses		RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Total Organic Carbon (TOC)		10.0		54.4	59.7	0	91.2	90	110		11/16/2012

Batch	R170625	SampType:	MS	Units	mg/L						Date Analyzed
SampID:	12110726-004EMS										
Analyses		RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Total Organic Carbon (TOC)		1.0		7.7	5.0	3.130	92.0	85	115		11/16/2012

Batch	R170625	SampType:	MSD	Units	mg/L	RPD Limit	10				Date Analyzed
SampID:	12110726-004EMSD										
Analyses		RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD		
Total Organic Carbon (TOC)		1.0		7.8	5.0	3.130	92.4	7.730	0.26		11/16/2012

EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)											
Batch	83483	SampType:	MBLK	Units	µg/L						Date Analyzed
SampID:	MB-83483										
Analyses		RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit		
Cadmium		2.00		< 2.00	2.00	0	0	-100	100		11/20/2012
Zinc		10.0		< 10.0	10.0	0	0	-100	100		11/20/2012

Quality Control Results

<http://www.teklabinc.com/>
Client: Barr Engineering Company

Work Order: 12110726

Client Project: River Mines MTS/25/86-0009

Report Date: 27-Nov-12

EPA 600 4.1.1, 200.7R4.4, METALS BY ICP (DISSOLVED)

Batch	SampType	Units	µg/L						Date Analyzed
83483	LCS								
	SampID:	LCS-83483							
Analyses	RL	Qual		Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit
Cadmium	2.00			44.8	50.0	0	89.6	85	115
Zinc	10.0			477	500	0	95.5	85	115

Batch	SampType	Units	µg/L						Date Analyzed
83483	MS								
	SampID:	12110726-001DMS							
Analyses	RL	Qual		Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit
Cadmium	2.00			54.9	50.0	12.1	85.6	75	125
Zinc	10.0	S		16800	500	16900	-10.0	75	125

Batch	SampType	Units	µg/L					RPD Limit	20	Date Analyzed
83483	MSD									
	SampID:	12110726-001DMSD								
Analyses	RL	Qual		Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Cadmium	2.00			54.7	50.0	12.1	85.2	54.9	0.36	11/20/2012
Zinc	10.0	S		16800	500	16900	-12.0	16850	0.06	11/20/2012

EPA 600 4.1.4, 200.7R4.4, METALS BY ICP (TOTAL)

Batch	SampType	Units	µg/L						Date Analyzed
83461	MBLK								
	SampID:	MB-83461							
Analyses	RL	Qual		Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit
Cadmium	2.00			< 2.00	2.00	0	0	-100	100
Zinc	10.0			< 10.0	10.0	0	0	-100	100

Batch	SampType	Units	µg/L						Date Analyzed
83461	LCS								
	SampID:	LCS-83461							
Analyses	RL	Qual		Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit
Cadmium	2.00			47.7	50.0	0	95.4	85	115
Zinc	10.0			496	500	0	99.3	85	115

Batch	SampType	Units	µg/L						Date Analyzed
83461	MS								
	SampID:	12110726-002CMS							
Analyses	RL	Qual		Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit
Cadmium	2.00			48.0	50.0	0	96.0	75	125
Zinc	10.0			500	500	3.2	99.4	75	125

Batch	SampType	Units	µg/L					RPD Limit	20	Date Analyzed
83461	MSD									
	SampID:	12110726-002CMSD								
Analyses	RL	Qual		Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Cadmium	2.00			46.8	50.0	0	93.6	48	2.53	11/20/2012
Zinc	10.0			492	500	3.2	97.7	500.4	1.77	11/20/2012

Client: Barr Engineering Company

Work Order: 12110726

Client Project: River Mines MTS/25/86-0009

Report Date: 27-Nov-12

STANDARD METHODS 3030 E, 3113 B, METALS BY GFAA

Batch	SampType	Units	µg/L	Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Batch 83432	Sample Type: MBLK			Lead	2.00		< 2.00	2.00	0	32.0	-100	100	11/16/2012

Batch	SampType	Units	µg/L	Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Batch 83432	LCS			Lead	2.00		15.0	15.0	0	99.9	85	115	11/16/2012

Batch	SampType	Units	µg/L	Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Batch 83432	MS			Lead	10.0		38.5	15.0	24.827	91.2	70	130	11/16/2012

Batch	SampType	Units	µg/L	Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Batch 83432	MSD			Lead	10.0		38.0	15.0	24.827	88.1	38.511	1.24	11/16/2012

STANDARD METHODS 3030 B, 3113 B, METALS BY GFAA (DISSOLVED)													
Batch	SampType	Units	µg/L	Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Batch 83435	MBLK			Lead	2.00		< 2.00	2.00	0	0	-100	100	11/16/2012

Batch	SampType	Units	µg/L	Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Batch 83435	LCS			Lead	2.00		13.1	15.0	0	87.4	85	115	11/16/2012

Batch	SampType	Units	µg/L	Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Batch 83435	MS			Lead	10.0		28.6	15.0	15.9835	83.9	70	130	11/16/2012

Batch	SampType	Units	µg/L	Analyses	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Batch 83435	MSD			Lead	10.0		27.6	15.0	15.9835	77.3	28.5745	3.55	11/16/2012

Receiving Check List

<http://www.teklabinc.com/>

Client: Barr Engineering Company

Work Order: 12110726

Client Project: River Mines MTS/25/86-0009

Report Date: 27-Nov-12

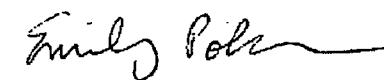
Carrier: Rick Schmidt

Received By: SRH

Completed by:

On:

15-Nov-12



Emily E. Pohlman

Reviewed by:

On:

15-Nov-12



Michael L. Austin

Pages to follow: Chain of custody

Extra pages included

Shipping container/coolier in good condition?

Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>	Temp °C <input type="text" value="5.6"/>
---	-----------------------------	--------------------------------------	--

Type of thermal preservation?

None <input type="checkbox"/>	Ice <input checked="" type="checkbox"/>	Blue Ice <input type="checkbox"/>	Dry Ice <input type="checkbox"/>
-------------------------------	---	-----------------------------------	----------------------------------

Chain of custody present?

Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>		
---	-----------------------------	--	--

Chain of custody signed when relinquished and received?

Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>		
---	-----------------------------	--	--

Chain of custody agrees with sample labels?

Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>		
---	-----------------------------	--	--

Samples in proper container/bottle?

Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>		
---	-----------------------------	--	--

Sample containers intact?

Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>		
---	-----------------------------	--	--

Sufficient sample volume for indicated test?

Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>		
---	-----------------------------	--	--

All samples received within holding time?

Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>		
---	-----------------------------	--	--

Reported field parameters measured:

Field <input type="checkbox"/>	Lab <input checked="" type="checkbox"/>	NA <input type="checkbox"/>
--------------------------------	---	-----------------------------

Container/Temp Blank temperature in compliance?

Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>		
---	-----------------------------	--	--

When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.

Water – at least one vial per sample has zero headspace?

Yes <input type="checkbox"/>	No <input type="checkbox"/>	No VOA vials <input checked="" type="checkbox"/>
------------------------------	-----------------------------	--

Water - TOX containers have zero headspace?

Yes <input type="checkbox"/>	No <input type="checkbox"/>	No TOX containers <input checked="" type="checkbox"/>
------------------------------	-----------------------------	---

Water - pH acceptable upon receipt?

Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>		
---	-----------------------------	--	--

NPDES/CWA TCN interferences checked/treated in the field?

Yes <input type="checkbox"/>	No <input type="checkbox"/>	NA <input checked="" type="checkbox"/>
------------------------------	-----------------------------	--

Any No responses must be detailed below or on the COC.

Teklab Chain of Custody

Pg. 1 of 1Workorder 12110726

5445 Horseshoe Lake Road ~ Collinsville, IL 62234 ~ Phone: (618)344-1004 ~ Fax:(618)344-1005

Barr Engineering Co.

Are the samples chilled? Yes No with: Ice Blue icePreserved in Lab Field

1001 Diamond Ridge, Suite 1100

Cooler Temp 5.6 Sampler SBM

Jefferson City

MO

65109

Comments

Invoice to Mark Nations. Results to Allison Olds and Mark Nations, mnations@doerun.com.
Matrix is surface water.

Rivermines MTS - 25/86-0009

Metals: Cd, Pb, Zn

Custody seal intact upon pick up

Contact Allison Olds

eMail aolds@barr.com

Phone 573-638-5007

Requested Due Date

Standard

Billing/PO

Per contract with Doe Run

Lab Use	Sample ID	Sample Date/Time	Preservative Matrix	pH	T.S.S.	Sulfate	Settleable Solids	T.O.C.	Total Metals	Dissolved Metals	Hardness				
12110726 -001	RM-001	11-14-12 13:00	Unpres	Aqueous	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
-002	RM-Dup	11-14-12 12:15	Unpres	Aqueous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
-003	RM-US	11-14-12 12:10	Unpres	Aqueous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
-004	RM-DS	11-14-12 11:45	Unpres	Aqueous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
			Unpres	Aqueous	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
			Unpres	Aqueous	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
			Unpres	Aqueous	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
			Unpres	Aqueous	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						

Relinquished By *	Date/Time	Received By	Date/Time
Stephen Moilana <u>SM</u>	11-14-12 16:00 11-15-12 14:25	<u>R. Stephen Hayes</u>	11-15-12 12:25 11-15-12 14:25

* The individual signing this agreement on behalf of client acknowledges that they have read and understand the terms of this agreement and that they have the authority to sign on behalf of client.

THE DOE RUN COMPANY

SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample	Lab	Sample Name	Pb	Zn	Cu	Cd	Ni	Tl	Fe	Alka	S04	pH	TSS	Sulfide	Phos	Turbidity
Date	Number		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	FAU	
11/2/12	12-6884	RMP BYPASS T	3.1	3060^	8.9	ND	218	ND	818	181	836	7.14	8	1.3	0.07	10
		RMP BYPASS D		70					820***							

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34



Quentin J. Schmidt Analytical Laboratory
43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

Associated Lab Samples: L12-0001-6884

METHOD BLANK

MATRIX: Water

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	0.01	0.38	11/2/12	
Copper	ug/L	1.6	0.97	11/2/12	
Lead	ug/L	ND	2.7	11/2/12	
Zinc	ug/L	ND	0.91	11/2/12	
Nickel	ug/L	ND	0.86	11/2/12	
Thallium	ug/L	5.4	1.86	11/2/12	
Iron	ug/L	ND	2.0	11/2/12	

LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	477	95%	85-125%	
Copper	ug/L	500	475	95%	85-125%	
Lead	ug/L	500	474	95%	85-125%	
Zinc	ug/L	500	474	95%	85-125%	
Nickel	ug/L	500	471	94%	85-125%	
Iron	ug/L	500	444	89%	85-125%	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 12-6868(1/100 Dil)

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0.37	500	500	476	473	95%	95%	75-125%	
Copper	ug/L	12	500	500	471	472	92%	92%	75-125%	
Lead	ug/L	0	500	500	469	469	94%	94%	75-125%	
Zinc	ug/L	31	500	500	500	499	94%	94%	75-125%	
Nickel	ug/L	2.6	500	500	467	464	93%	92%	75-125%	
Iron	ug/L	11	500	500	511	424	100%	83%	75-125%	



Quentin J. Schmidt Analytical Laboratory
43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

MATRIX: Water

Associated Lab Samples: L12-0001-6884

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	1.33	5	11/8/12	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	100	95	95%	85-115%	

LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	100	95	95%	85-115%	

LABORATORY SAMPLE DUPLICATE 12-6884

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	181	180	95%	85-115%	

pH SM4500-H+F	Results	QC Limits	Lab Standard Number
ICV Buffer 7.00	7.01	6.95-7.05	L11-0002-0121
ICV Buffer 4.00	4.02	3.95-4.05	L12-0002-0046
ICV Buffer 10.01	10.01	9.96-10.06	L12-0002-0047
CCV Buffer 10.00	9.99	9.96-10.06	L11-0002-0122
CCV Buffer 4.00	4.01	3.95-4.05	L12-0002-0048

Slope 96.3% 90-102%



Quentin J. Schmidt Analytical Laboratory
43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAF 300.0

Associated Lab Samples: L12-0001-6884

METHOD BLANK MATRIX: Water

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	11/2/12	

MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME:

Parameter	Units	Results	MS Spike Conc	MS Results	MS % Rec	Rec Limits	Qual
Sulfate 12-6884	mg/l	8.4	4	11.8	85%	75-125	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/l	5	4.5	90%	85-115	



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QUALITY CONTROL DATA

SEMO PROJECT: RMP ByPass

ANALYSIS DESCRIPTION: 2540D Total Suspended Solids

METHOD BLANK

MATRIX: Water

Associated Lab Samples: L12-0001-6884

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solid	mg/L	1	5	11/5/2012	

LABORATORY CONTROL SAMPLE L12-0002-0099

Parameter	Units	Conc.	LCS Results	% Rec	% Rec	Qualifiers
Total Suspended Solid	mg/L	5	6	120%	75-125	

LAB DUPLICATE

SAMPLE NUMBER / NAME: 12-6884

Parameter	Units	Results	Dup Results	% Rec	% Rec	Qualifiers
Total Suspended Solid	mg/L	8	8	100%	75-125	

LABORATORY CONTROL SAMPLE L12-0002-0099

Parameter	Units	Conc.	LCS Results	LCS % Rec	% Rec	Qualifiers
Total Suspended Solid	mg/L	5	5.5	110%	75-125	



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43 Iron County Road No 1 Bldg 3

Viburnum, MO 65566

(573) 244-8105

QUALIFIERS**SEMO PROJECT****DEFINITIONS**

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
	Filtered Samples prepared in the field.

ANALYTE QUALIFIERS

- H** Analysis conducted outside the EPA method holding time.
M Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
R RPD value was outside control limits.

NES Not enough sample.

Method	Analysts
200.7	TLL
Alka	AMM
IC	TLL

Report Acceptance	
QAO	Date
GWP	11/9/2012
Manager	Date
EJS	11/9/2012

THE DOE RUN COMPANY

SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample	Lab	Sample Name	Pb	Zn	Cu	Cd	Ni	Tl	Fe	Alka	S04	pH	TSS	Sulfide	Phos	Turbidity
Date	Number		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	FAU	
11/5/12	12-6910	RMP BYPASS T	ND	3384^	ND	ND	224	6.9	887	183	861	6.99	7.5	1.2	0.07	0
		RMP BYPASS D		3.6					790							

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34

SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

Associated Lab Samples: L12-0001-6910

METHOD BLANK

MATRIX: Water

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	0.21	0.38		
Copper	ug/L	ND	0.97		
Lead	ug/L	0.006	2.7		
Zinc	ug/L	0.53	0.91		
Nickel	ug/L	ND	0.86		
Thallium	ug/L	0.93	1.86		
Iron	ug/L	ND	2.0		

LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	511	102%	85-125%	
Copper	ug/L	500	490	98%	85-125%	
Lead	ug/L	500	509	102%	85-125%	
Zinc	ug/L	500	510	102%	85-125%	
Nickel	ug/L	500	507	101%	85-125%	
Iron	ug/L	500	498	100%	85-125%	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 12-6910(1/100 Dil)

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0.09	500	500	544	553	109%	111%	75-125%	
Copper	ug/L	0	500	500	487	500	97%	100%	75-125%	
Lead	ug/L	0.16	500	500	500	508	100%	102%	75-125%	
Zinc	ug/L	34	500	500	589	603	111%	114%	75-125%	
Nickel	ug/L	2.6	500	500	493	504	98%	100%	75-125%	
Iron	ug/L	0	500	500	411	455	82%	91%	75-125%	



Quentin J. Schmidt Analytical Laboratory
43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

MATRIX: Water

Associated Lab Samples: L12-0001-6910

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	1.3	5	11/8/12	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	100	95	95%	85-115%	

LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	100	95	95%	85-115%	

LABORATORY SAMPLE DUPLICATE 12-6910

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	183	183	95%	85-115%	

pH SM4500-H+I	Results	QC Limits	Lab Standard Number
ICV Buffer 7.00	7.01	6.95-7.05	L11-0002-0121
ICV Buffer 4.00	4.02	3.95-4.05	L12-0002-0046
ICV Buffer 10.01	10.01	9.96-10.06	L12-0002-0047
CCV Buffer 10.00	9.99	9.96-10.06	L11-0002-0122
CCV Buffer 4.00	4.01	3.95-4.05	L12-0002-0048
Slope	96.3%	90-102%	



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Viburnum, MO 65566
(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAPH 300.0

Associated Lab Samples: L12-0001-6910

METHOD BLANK MATRIX: Water

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	11/5/12	

MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME:

Parameter	Units	Results	MS Spike Conc	MS Results	MS % Rec	Rec Limits	Qual
Sulfate 12-6910	mg/l	8.6	4	12.2	90%	75-125	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/l	5	4.5	90%	85-115	



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43 Iron County Road No 1 Bldg 3
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(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: RMP ByPass

ANALYSIS DESCRIPTION: 2540D Total Suspended Solids

METHOD BLANK

MATRIX: Water

Associated Lab Samples: L12-0001-6910

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solid	mg/L	1	5	11/5/2012	

LABORATORY CONTROL SAMPLE L12-0002-0099

Parameter	Units	Conc.	LCS Results	% Rec	% Rec	Qualifiers
Total Suspended Solid	mg/L	5	6	120%	75-125	

LAB DUPLICATE

SAMPLE NUMBER / NAME: L12-0001-6910

Parameter	Units	Results	Dup Results	Limits	% Rec	Qualifiers
Total Suspended Solid	mg/L	NES	NES	75-125		

LABORATORY CONTROL SAMPLE L12-0002-0099

Parameter	Units	Conc.	LCS Results	% Rec	% Rec	Qualifiers
Total Suspended Solid	mg/L	5	5.5	110%	75-125	



Quentin J. Schmidt Analytical Laboratory

43 Iron County Road No 1 Bldg 3

Viburnum, MO 65566

(573) 244-8105

QUALIFIERS**SEMO PROJECT****DEFINITIONS**

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
	Filtered Samples prepared in the field.

ANALYTE QUALIFIERS

- H** Analysis conducted outside the EPA method holding time.
M Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
R RPD value was outside control limits.

NES Not enough sample.

Method	Analysts
200.7	TLL
Alka	AMM
IC	TLL

Report Acceptance	
QAO	Date
WP	11/9/2012
Manager	Date
EJS	11/9/2012

THE DOE RUN COMPANY

SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample	Lab	Sample Name	Pb	Zn	Cu	Cd	Ni	Tl	Fe	Alka	S04	pH	Turbidity
Date	Number		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	FAU
11/9/12	12-7071	RMP ROUGH T	ND	2745^	ND	ND	226	7.8	945	184	881	7.34	9
				416					845				

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34

SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

METHOD BLANK

Associated Lab Samples: L12-0001-7071

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	0.13	0.38	11/9/12	
Copper	ug/L	1.6	0.97	11/9/12	
Lead	ug/L	ND	2.7	11/9/12	
Zinc	ug/L	ND	0.91	11/9/12	
Nickel	ug/L	ND	0.86	11/9/12	
Thallium	ug/L	ND	1.86	11/9/12	
Iron	ug/L	0.75	2.0	11/9/12	

LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	500	100%	85-115%	
Copper	ug/L	500	495	99%	85-115%	
Lead	ug/L	500	492	98%	85-115%	
Zinc	ug/L	500	493	99%	85-115%	
Nickel	ug/L	500	486	97%	85-115%	
Iron	ug/L	500	462	92%	85-115%	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 12-7071(1/100 Dil)

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0.12	500	500	476	485	95%	97%	75-125%	
Copper	ug/L	0	500	500	476	482	95%	96%	75-125%	
Lead	ug/L	0	500	500	471	473	94%	95%	75-125%	
Zinc	ug/L	27	500	500	500	508	95%	96%	75-125%	
Nickel	ug/L	2.8	500	500	469	468	93%	93%	75-125%	
Iron	ug/L	20	500	500	464	456	89%	87%	75-125%	



Quentin J. Schmidt Analytical Laboratory
43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

METHOD BLANK

Associated Lab Samples: L12-0001-7071

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	1.48	5	11/14/12	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	100	98.89	99%	85-115%	

LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	100	98.39	98%	85-115%	

LABORATORY SAMPLE DUPLICATE 12-7071

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	184.43	183.93	100%	85-115%	

pH SM4500-H+I Results QC Limits Lab Standard Number

ICV Buffer 7.00	6.99	6.95-7.05	L11-0002-0121
ICV Buffer 4.00	4.01	3.95-4.05	L12-0002-0046
ICV Buffer 10.01	10.01	9.96-10.06	L12-0002-0047
CCV Buffer 10.00	10.04	9.96-10.06	L11-0002-0122
CCV Buffer 4.05	4.02	3.95-4.05	L12-0002-0048

Slope 93.9% 90-102%



Quentin J. Schmidt Analytical Laboratory
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Viburnum, MO 65566
(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAF 300.0

METHOD BLANK MATRIX: Water

Associated Lab Samples: L12-0001-7071

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	11/9/12	

MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME:

Parameter	Units	Results	MS Spike Conc	MS Results	MS % Rec	Rec Limits	Qual
Sulfate 12-7071	mg/l	8.8	4	12.5	93%	75-125	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec	Limits	Qualifiers
Sulfate	mg/l	5	4.5	90%	85-115		



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43 Iron County Road No 1 Bldg 3

Viburnum, MO 65566

(573) 244-8105

QUALIFIERS**SEMO PROJECT****DEFINITIONS**

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
F	Filtered Samples prepared in the field.

ANALYTE QUALIFIERS

- H Analysis conducted outside the EPA method holding time.
M Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
R RPD value was outside control limits.

NES Not enough sample.

Method	Analysts
200.7	TLL
Alka	MM
IC	TLL

Report Acceptance	
QAO	Date
GWP	11/15/2012
Manager	Date
EJS	11/15/2012

THE DOE RUN COMPANY

SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample	Lab	Sample Name	Pb	Zn	Cu	Cd	Ni	Tl	Fe	Alka	S04	pH	Turbidity
Date	Number		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	FAU
11/12/12	12-7116	RMP ROUGH T	3.7	3296^	2.3	ND	237	4.8	983	190	673	7.01	5
				694					935				

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34

SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

METHOD BLANK

Associated Lab Samples: L12-0001-7116

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	ND	0.38	11/13/12	
Copper	ug/L	.66	0.97	11/13/12	
Lead	ug/L	ND	2.7	11/13/12	
Zinc	ug/L	ND	0.91	11/13/12	
Nickel	ug/L	0.09	0.86	11/13/12	
Thallium	ug/L	0.84	1.86	11/13/12	
Iron	ug/L	ND	2.0	11/13/12	

LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	488	98%	85-115%	
Copper	ug/L	500	478	96%	85-115%	
Lead	ug/L	500	486	97%	85-115%	
Zinc	ug/L	500	486	97%	85-115%	
Nickel	ug/L	500	482	96%	85-115%	
Iron	ug/L	500	461	92%	85-115%	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 12-7116 (1/100 Dil)

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0.0	500	500	475.5	469	95%	94%	75-125%	
Copper	ug/L	0.3	500	500	474.8	467	95%	93%	75-125%	
Lead	ug/L	0.6	500	500	473.5	467	95%	93%	75-125%	
Zinc	ug/L	33.0	500	500	505.3	498	94%	93%	75-125%	
Nickel	ug/L	2.9	500	500	471.7	463	94%	92%	75-125%	
Iron	ug/L	6.9	500	500	478.5	460.8	94%	91%	75-125%	



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43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

METHOD BLANK

Associated Lab Samples: L12-0001-7116

Parameter	Units	Blank Result	Limit	Reported	Analyzed	Qualifiers
Alkalinity	mg/L	1.5	5		11/14/12	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	100	98.9	99%	85-115%	

LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	100	98.4	98%	85-115%	

LABORATORY SAMPLE DUPLICATE 12-7116

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	190	189	99%	85-115%	

pH SM4500-H+F	Results	QC Limits	Lab Standard Number
ICV Buffer 7.00	6.99	6.95-7.05	L11-0002-0121
ICV Buffer 4.00	4.01	3.95-4.05	L12-0002-0046
ICV Buffer 10.01	10.01	9.96-10.06	L12-0002-0047
CCV Buffer 10.00	10.04	9.96-10.06	L11-0002-0122
CCV Buffer 4.05	4.02	3.95-4.05	L12-0002-0048
Slope	93.9%	90-102%	



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43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAF 300.0

METHOD BLANK MATRIX: Water

Associated Lab Samples: L12-0001-7116

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	11/19/12	

MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME:

Parameter	Units	Results	MS Spike Conc	MS Results	MS % Rec	Rec Limits	Qual
Sulfate 12-7116	mg/l	6.7	4	10.5	95%	75-125	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec	Limits	Qualifiers
Sulfate	mg/l	5	4.5	90%	85-115		



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QUALIFIERS**SEMO PROJECT****DEFINITIONS**

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
	Filtered Samples prepared in the field.

ANALYTE QUALIFIERS**H** Analysis conducted outside the EPA method holding time.**M** Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.**R** RPD value was outside control limits.**NES** Not enough sample.

Method	Analysts
200.7	TLL
Alka	JAA
IC	TLL

Report Acceptance	
QAO	Date
GWP	11/20/2012
Manager	Date
EJS	11/20/2012

THE DOE RUN COMPANY

SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample	Lab	Sample Name	Pb	Zn	Cu	Cd	Ni	Tl	Fe	Alka	S04	pH	Turbidity
Date	Number		ug/l	mg/l	mg/l	mg/l	FAU						
11/14/12	12-7188	RMP ROUGH T	ND	4528	ND	ND	291	12	1084	185	658	6.91	3
				1955					982				

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34

SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

METHOD BLANK

Associated Lab Samples: L12-0001-7188

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	ND	0.38	11/15/12	
Copper	ug/L	ND	0.97	11/15/12	
Lead	ug/L	1.4	2.7	11/15/12	
Zinc	ug/L	10.4	0.91	11/15/12	
Nickel	ug/L	ND	0.86	11/15/12	
Thallium	ug/L	1.0	1.86	11/15/12	
Iron	ug/L	9.9	2.0	11/15/12	

LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	498	100%	85-115%	
Copper	ug/L	500	479	96%	85-115%	
Lead	ug/L	500	497	99%	85-115%	
Zinc	ug/L	500	498	100%	85-115%	
Nickel	ug/L	500	491	98%	85-115%	
Iron	ug/L	500	494	99%	85-115%	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 12-7188 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0.39	500	500	485	483	97%	97%	75-125%	
Copper	ug/L	0	500	500	473	472	95%	94%	75-125%	
Lead	ug/L	3.4	500	500	490	475	97%	94%	75-125%	
Zinc	ug/L	42.3	500	500	524	521	96%	96%	75-125%	
Nickel	ug/L	3.3	500	500	477	475	95%	94%	75-125%	
Iron	ug/L	25.6	500	500	494	481	94%	91%	75-125%	



Quentin J. Schmidt Analytical Laboratory
43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

METHOD BLANK

Associated Lab Samples: L12-0001-7188

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	1.5	5	11/14/12	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	100	98.9	99%	85-115%	

LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	100	98.4	98%	85-115%	

LABORATORY SAMPLE DUPLICATE 12-7188

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	185	184	99%	85-115%	

pH SM4500-H+F	Results	QC Limits	Lab Standard Number
ICV Buffer 7.00	6.99	6.95-7.05	L11-0002-0121
ICV Buffer 4.00	4.01	3.95-4.05	L12-0002-0046
ICV Buffer 10.01	10.01	9.96-10.06	L12-0002-0047
CCV Buffer 10.00	10.04	9.96-10.06	L11-0002-0122
CCV Buffer 4.05	4.02	3.95-4.05	L12-0002-0048

Slope 93.9% 90-102%



Quentin J. Schmidt Analytical Laboratory
43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAPH 300.0

METHOD BLANK MATRIX: Water

Associated Lab Samples: L12-0001-7188

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	11/19/12	

MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME:

Parameter	Units	Results	MS Spike Conc	MS Results	MS % Rec	Rec Limits	Qual
Sulfate 12-7188	mg/l	6.6	4	10.4	95%	75-125	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/l	5	4.5	90%	85-115	



Quentin J. Schmidt Analytical Laboratory

43 Iron County Road No 1 Bldg 3

Viburnum, MO 65566

(573) 244-8105

QUALIFIERS

SEMO PROJECT

DEFINITIONS

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
FS	Filtered Samples prepared in the field.

ANALYTE QUALIFIERS

- H** Analysis conducted outside the EPA method holding time.
M Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
R RPD value was outside control limits.
NES Not enough sample.

Method	Analysts
200.7	TLL
Alka	MM
IC	TLL

Report Acceptance	
QAO	Date
GWP	11/20/2012
Manager	Date
EJS	11/20/2012

THE DOE RUN COMPANY

SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample	Lab	Sample Name	Pb	Zn	Cu	Cd	Ni	Tl	Fe	Alka	S04	pH	Turbidity
Date	Number		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	FAU
11/16/12	12-7219	RMP ROUGH T	2.0 J	4487^	ND	ND	313	5.6	1117	192	690	8.24	2
				2428					1115				

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34

SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

METHOD BLANK

Associated Lab Samples: L12-0001-7219

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	0.06	0.38	11/16/12	
Copper	ug/L	0.56	0.97	11/16/12	
Lead	ug/L	ND	2.7	11/16/12	
Zinc	ug/L	0.79	0.91	11/16/12	
Nickel	ug/L	0.42	0.86	11/16/12	
Thallium	ug/L	1.3	1.86	11/16/12	
Iron	ug/L	ND	2.0	11/16/12	

LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	488	98%	85-115%	
Copper	ug/L	500	474	95%	85-115%	
Lead	ug/L	500	484	97%	85-115%	
Zinc	ug/L	500	478	96%	85-115%	
Nickel	ug/L	500	485	97%	85-115%	
Iron	ug/L	500	462	92%	85-115%	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 12-7219 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0	500	500	495	491	99%	98%	75-125%	
Copper	ug/L	0.73	500	500	500	495	100%	99%	75-125%	
Lead	ug/L	0	500	500	491	488	98%	98%	75-125%	
Zinc	ug/L	45	500	500	531	528	97%	97%	75-125%	
Nickel	ug/L	3.8	500	500	496	494	98%	98%	75-125%	
Iron	ug/L	2.6	500	500	481	498	96%	99%	75-125%	



Quentin J. Schmidt Analytical Laboratory
43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

METHOD BLANK

Associated Lab Samples: L12-0001-7219

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	1.48	5	11/20/12	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	100	96	96%	85-115%	

LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	100	96	96%	85-115%	

LABORATORY SAMPLE DUPLICATE 12-7219

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	NES	NES		85-115%	

pH SM4500-H+F	Results	QC Limits	Lab Standard Number
ICV Buffer 7.00	7.01	6.95-7.05	L11-0002-0121
ICV Buffer 4.00	3.98	3.95-4.05	L12-0002-0046
ICV Buffer 10.01	10.00	9.96-10.06	L12-0002-0047
CCV Buffer 10.00	9.97	9.96-10.06	L11-0002-0122
CCV Buffer 4.05	3.98	3.95-4.05	L12-0002-0048

Slope 98.4% 90-102%



Quentin J. Schmidt Analytical Laboratory
43 Iron County Road No 1 Bldg. 3
Viburnum, MO 65566
(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAF 300.0

METHOD BLANK MATRIX: Water

Associated Lab Samples: L12-0001-7219

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	11/19/12	

MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME:

Parameter	Units	Results	MS Spike Conc	MS Results	MS % Rec	Rec Limits	Qual
Sulfate 12-7219	mg/l	6.9	4	10.5	90%	75-125	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec	Limits	Qualifiers
Sulfate	mg/l	5	4.5	90%	85-115		



Quentin J. Schmidt Analytical Laboratory

43 Iron County Road No 1 Bldg 3

Viburnum, MO 65566

(573) 244-8105

QUALIFIERS**SEMO PROJECT****DEFINITIONS**

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
.	Filtered Samples prepared in the field.

ANALYTE QUALIFIERS

- H** Analysis conducted outside the EPA method holding time
M Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
R RPD value was outside control limits.

NES Not enough sample.

Method	Analysts
200.7	TLL
Alka	MM
IC	TLL

Report Acceptance	
QAO	Date
GWP	11/21/2012
Manager	Date
EJS	11/21/2012

THE DOE RUN COMPANY

SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample	Lab	Sample Name	Pb	Zn	Cu	Cd	Ni	Tl	Fe	Alka	S04	pH	Turbidity
Date	Number		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	FAU
11/19/12	12-7236	RMP ROUGH T	1.5 J	5780^	ND	3.1	339	6.2	1279	188	699	7.39	4
				3011					1225				

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34

SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

METHOD BLANK

Associated Lab Samples: L12-0001-7236

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	0.07	0.38	11/20/12	
Copper	ug/L	4.3	0.97	11/20/12	
Lead	ug/L	0.40	2.7	11/20/12	
Zinc	ug/L	1.5	0.91	11/20/12	
Nickel	ug/L	ND	0.86	11/20/12	
Thallium	ug/L	0.23	1.86	11/20/12	
Iron	ug/L	ND	2.0	11/20/12	

LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	488	98%	85-115%	
Copper	ug/L	500	488	98%	85-115%	
Lead	ug/L	500	487	97%	85-115%	
Zinc	ug/L	500	485	97%	85-115%	
Nickel	ug/L	500	482	96%	85-115%	
Iron	ug/L	500	447	89%	85-115%	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 12-7236 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0.06	500	500	525	530	105%	106%	75-125%	
Copper	ug/L	0	500	500	464	466	93%	93%	75-125%	
Lead	ug/L	0	500	500	489	496	98%	99%	75-125%	
Zinc	ug/L	58	500	500	595	603	107%	109%	75-125%	
Nickel	ug/L	3.8	500	500	490	497	97%	99%	75-125%	
Iron	ug/L	3.2	500	500	445	493	88%	98%	75-125%	



Quentin J. Schmidt Analytical Laboratory
43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

METHOD BLANK

Associated Lab Samples: L12-0001-7236

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	1.48	5	11/20/12	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	100	96	96%	85-115%	

LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	100	96	96%	85-115%	

LABORATORY SAMPLE DUPLICATE 12-7236

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	188	187	99%	85-115%	

pH SM4500-H+I

Results	QC Limits	Lab Standard Number
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ICV Buffer 7.00	7.01	6.95-7.05	L11-0002-0121
ICV Buffer 4.00	3.98	3.95-4.05	L12-0002-0046
ICV Buffer 10.01	10.00	9.96-10.06	L12-0002-0047
CCV Buffer 10.00	9.97	9.96-10.06	L11-0002-0122
CCV Buffer 4.05	3.98	3.95-4.05	L12-0002-0048

Slope 98.4% 90-102%



Quentin J. Schmidt Analytical Laboratory
43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAPH 300.0

METHOD BLANK MATRIX: Water

Associated Lab Samples: L12-0001-7236

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	11/19/12	

MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME:

Parameter	Units	Results	MS Spike Conc	MS Results	MS % Rec	Rec Limits	Qual
Sulfate 12-7236	mg/l	6.9	4	10.1	80%	75-125	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/l	5	4.5	90%	85-115	

QUALIFIERS

SEMO PROJECT

DEFINITIONS

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
FWP	Filtered Samples prepared in the field.

ANALYTE QUALIFIERS

- H** Analysis conducted outside the EPA method holding time.
- M** Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
- R** RPD value was outside control limits.
- NES** Not enough sample.

Method	Analysts
200.7	TLL
Alka	MM
IC	TLL

Report Acceptance	
QAO	Date
GWP	11/21/2012
Manager	Date
EJS	11/21/2012

THE DOE RUN COMPANY

SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample	Lab	Sample Name	Pb	Zn	Cu	Cd	Ni	Tl	Fe	Alka	S04	pH	Turbidity
Date	Number		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	FAU
11/21/12	12-7272	RMP ROUGH T	ND	5820^	4.0	ND	358	7.3	1413	187	813	7.19	0
				3187					1322				

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34

SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

METHOD BLANK

Associated Lab Samples: L12-0001-7272

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	0.006	0.38	11/26/12	
Copper	ug/L	3.7	0.97	11/26/12	
Lead	ug/L	ND	2.7	11/26/12	
Zinc	ug/L	ND	0.91	11/26/12	
Nickel	ug/L	1.2	0.86	11/26/12	
Thallium	ug/L	1.1	1.86	11/26/12	
Iron	ug/L	1.2	2.0	11/26/12	

LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	493	99%	85-115%	
Copper	ug/L	500	470	94%	85-115%	
Lead	ug/L	500	492	98%	85-115%	
Zinc	ug/L	500	492	98%	85-115%	
Nickel	ug/L	500	496	99%	85-115%	
Iron	ug/L	500	474	95%	85-115%	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 12-7272 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0	500	500	533	524	107%	105%	75-125%	
Copper	ug/L	4	500	500	463	457	92%	91%	75-125%	
Lead	ug/L	0	500	500	499	493	100%	99%	75-125%	
Zinc	ug/L	58	500	500	604	594	109%	107%	75-125%	
Nickel	ug/L	4.1	500	500	502	494	100%	98%	75-125%	
Iron	ug/L	12	500	500	464	473	90%	92%	75-125%	



Quentin J. Schmidt Analytical Laboratory
43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

METHOD BLANK

Associated Lab Samples: L12-0001-7272

Parameter	Units	Reporting			Qualifiers
		Blank Result	Limit	Analyzed	
Alkalinity	mg/L	1.97	5	11/28/12	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS	% Rec	Qualifiers
				% Rec	Limits	
Alkalinity	mg/L CaCO ₃	100	96.4	96%	85-115%	

LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc	LCS Results	LCS	% Rec	Qualifiers
				% Rec	Limits	
Alkalinity	mg/L CaCO ₃	100	97.4	97%	85-115%	

LABORATORY SAMPLE DUPLICATE 12-7272

Parameter	Units	Results	Results Dup	LCS	% Rec	Qualifiers
				% Rec	Limits	
Alkalinity	mg/L CaCO ₃	187	187	100%	85-115%	

pH SM4500-H+F	Results	QC Limits	Lab Standard Number
ICV Buffer 7.00	7.00	6.95-7.05	L11-0002-0121
ICV Buffer 4.00	4.04	3.95-4.05	L12-0002-0046
ICV Buffer 10.01	10.02	9.96-10.06	L12-0002-0047
CCV Buffer 10.00	10.06	9.96-10.06	L11-0002-0122
CCV Buffer 4.05	4.04	3.95-4.05	L12-0002-0048

Slope 97.7% 90-102%



Quentin J. Schmidt Analytical Laboratory
43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAF 300.0

METHOD BLANK MATRIX: Water

Associated Lab Samples: L12-0001-7272

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	11/26/12	

MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME:

Parameter	Units	Results	MS Spike Conc	MS Results	MS % Rec	Rec Limits	Qual
Sulfate 12-7272	mg/l	8.1	4	11.4	83%	75-125	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec	Limits	Qualifiers
Sulfate	mg/l	5	4.5	90%	85-115		



Quentin J. Schmidt Analytical Laboratory

43 Iron County Road No 1 Bldg 3

Viburnum, MO 65566

(573) 244-8105

QUALIFIERS**SEMO PROJECT****DEFINITIONS**

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
	Filtered Samples prepared in the field.

ANALYTE QUALIFIERS**H** Analysis conducted outside the EPA method holding time.**M** Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.**R** RPD value was outside control limits.**NES** Not enough sample.

Method	Analysts
200.7	TLL
Alka	MM
IC	TLL

Report Acceptance	
QAO	Date
GWP	11/29/2012
Manager	Date
EJS	11/29/2012

THE DOE RUN COMPANY

SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample	Lab	Sample Name	Pb	Zn	Cu	Cd	Ni	Tl	Fe	Alka	S04	pH	Turbidity
Date	Number		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	FAU
11/26/12	12-7311	RMP ROUGH T	2.2 J	6927^	1.2	ND	381	2.9	1802	180	791	7.09	4
		RMP ROUGH D		4052					1698				

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34

SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

METHOD BLANK

Associated Lab Samples: L12-0001-7311

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	ND	0.38	11/29/12	
Copper	ug/L	0.25	0.97	11/29/12	
Lead	ug/L	0.20	2.7	11/29/12	
Zinc	ug/L	ND	0.91	11/29/12	
Nickel	ug/L	ND	0.86	11/29/12	
Thallium	ug/L	ND	1.86	11/29/12	
Iron	ug/L	ND	2.0	11/29/12	

LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	470	94%	85-115%	
Copper	ug/L	500	500	100%	85-115%	
Lead	ug/L	500	476	95%	85-115%	
Zinc	ug/L	500	465	93%	85-115%	
Nickel	ug/L	500	476	95%	85-115%	
Iron	ug/L	500	456	91%	85-115%	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 12-7311 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0.04	500	500	504	520	101%	104%	75-125%	
Copper	ug/L	3.8	500	500	433	451	86%	89%	75-125%	
Lead	ug/L	0.12	500	500	464	484	93%	97%	75-125%	
Zinc	ug/L	69	500	500	590	605	104%	107%	75-125%	
Nickel	ug/L	4.5	500	500	457	474	91%	94%	75-125%	
Iron	ug/L	1.3	500	500	441	452	88%	90%	75-125%	



Quentin J. Schmidt Analytical Laboratory
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Viburnum, MO 65566
(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

METHOD BLANK

Associated Lab Samples: L12-0001-7311

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	1.97	5	11/28/12	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	100	96.4	96%	85-115%	

LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	100	97.4	97%	85-115%	

LABORATORY SAMPLE DUPLICATE 12-7311

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	180.1	180.1	100%	85-115%	

pH SM4500-H+F	Results	QC Limits	Lab Standard Number
ICV Buffer 7.00	7.00	6.95-7.05	L11-0002-0121
ICV Buffer 4.00	4.04	3.95-4.05	L12-0002-0046
ICV Buffer 10.01	10.02	9.96-10.06	L12-0002-0047
CCV Buffer 10.00	10.06	9.96-10.06	L11-0002-0122
CCV Buffer 4.05	4.04	3.95-4.05	L12-0002-0048
Slope	97.7%	90-102%	



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QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAF 300.0

METHOD BLANK MATRIX: Water

Associated Lab Samples: L12-0001-7311

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	11/26/12	

MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME:

Parameter	Units	Results	MS Spike Conc	MS Results	MS % Rec	Rec Limits	Qual
Sulfate 12-7311	mg/l	7.9	4	11.8	98%	75-125	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec	Limits	Qualifiers
Sulfate	mg/l	5	4.5	90%	85-115		



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QUALIFIERS

SEMO PROJECT

DEFINITIONS

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
FF	Filtered Samples prepared in the field.

ANALYTE QUALIFIERS

- H Analysis conducted outside the EPA method holding time.
- M Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
- R RPD value was outside control limits.

NES Not enough sample.

Method	Analysts
200.7	TLL
Alka	MM
IC	TLL

Report Acceptance	
QAO	Date
GWP	11/30/2012
Manager	Date
EJS	11/30/2012

THE DOE RUN COMPANY

SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample	Lab	Sample Name	Pb	Zn	Cu	Cd	Ni	Tl	Fe	Alka	S04	pH	Turbidity
Date	Number		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	FAU
11/28/12	12-7377	RMP ROUGH T	3.5	7204^	ND	ND	381	35	2090	178	818	7.11	2
		RMP ROUGH D		4223					1909				

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34



Quentin J. Schmidt Analytical Laboratory
43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

METHOD BLANK

Associated Lab Samples: L12-0001-7311

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	0.05	0.38	11/30/12	
Copper	ug/L	1.6	0.97	11/30/12	
Lead	ug/L	0.09	2.7	11/30/12	
Zinc	ug/L	0.29	0.91	11/30/12	
Nickel	ug/L	0.50	0.86	11/30/12	
Thallium	ug/L	ND	1.86	11/30/12	
Iron	ug/L	2.5	2.0	11/30/12	

LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	492	98%	85-115%	
Copper	ug/L	500	480	96%	85-115%	
Lead	ug/L	500	485	97%	85-115%	
Zinc	ug/L	500	487	97%	85-115%	
Nickel	ug/L	500	484	97%	85-115%	
Iron	ug/L	500	494	99%	85-115%	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 12-7311 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0	500	500	535	528	107%	106%	75-125%	
Copper	ug/L	0.07	500	500	434	431	87%	86%	75-125%	
Lead	ug/L	0.74	500	500	494	486	99%	97%	75-125%	
Zinc	ug/L	72	500	500	613	604	108%	106%	75-125%	
Nickel	ug/L	3.8	500	500	481	473	95%	94%	75-125%	
Iron	ug/L	14	500	500	441	491	85%	95%	75-125%	



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QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

METHOD BLANK

Associated Lab Samples: L12-0001-7377

Parameter	Units	Reporting			Qualifiers
		Blank Result	Limit	Analyzed	
Alkalinity	mg/L	1.97	5	11/28/12	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS	% Rec	Qualifiers
				% Rec	Limits	
Alkalinity	mg/L CaCO ₃	100	96.4	96%	85-115%	

LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc	LCS Results	LCS	% Rec	Qualifiers
				% Rec	Limits	
Alkalinity	mg/L CaCO ₃	100	97.4	97%	85-115%	

LABORATORY SAMPLE DUPLICATE 12-7377

Parameter	Units	Results	Results Dup	LCS	% Rec	Qualifiers
				% Rec	Limits	
Alkalinity	mg/L CaCO ₃	178.1	184	103%	85-115%	

pH SM4500-H+F	Results	QC Limits	Lab Standard Number
ICV Buffer 7.00	7.00	6.95-7.05	L11-0002-0121
ICV Buffer 4.00	4.04	3.95-4.05	L12-0002-0046
ICV Buffer 10.01	10.02	9.96-10.06	L12-0002-0047
CCV Buffer 10.00	10.06	9.96-10.06	L11-0002-0122
CCV Buffer 4.05	4.04	3.95-4.05	L12-0002-0048

Slope 97.7% 90-102%



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QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAF 300.0

METHOD BLANK MATRIX: Water

Associated Lab Samples: L12-0001-7311

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	11/28/12	

MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME:

Parameter	Units	Results	MS Spike Conc	MS Results	MS % Rec	Rec Limits	Qual
Sulfate 12-7377	mg/l	8.2	4	11.7	88%	75-125	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec	Limits	Qualifiers
Sulfate	mg/l	5	4.6	92%	85-115		



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QUALIFIERS**SEMO PROJECT****DEFINITIONS**

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
	Filtered Samples prepared in the field.

ANALYTE QUALIFIERS

- H** Analysis conducted outside the EPA method holding time.
M Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
R RPD value was outside control limits.

NES Not enough sample.

Method	Analysts
200.7	TLL
Alka	MM
IC	TLL

Report Acceptance	
QAO	Date
GWP	11/30/2012
Manager	Date
EJS	11/30/2012

THE DOE RUN COMPANY

SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample	Lab	Sample Name	Pb	Zn	Cu	Cd	Ni	Tl	Fe	Alka	S04	pH	Turbidity
Date	Number		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	FAU
11/30/12	12-7405	RMP ROUGH T	1.7 J	6211^	0.69J	0.28 J	343	26	2345	179	836	7.82	4
		RMP ROUGH D		3763					2071				

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34

SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

METHOD BLANK

Associated Lab Samples: L12-0001-7405

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	ND	0.38	11/30/12	
Copper	ug/L	3.7	0.97	11/30/12	
Lead	ug/L	0.51	2.7	11/30/12	
Zinc	ug/L	0.14	0.91	11/30/12	
Nickel	ug/L	0.11	0.86	11/30/12	
Thallium	ug/L	ND	1.86	11/30/12	
Iron	ug/L	3.7	2.0	11/30/12	

LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	503	101%	85-115%	
Copper	ug/L	500	498	100%	85-115%	
Lead	ug/L	500	503	101%	85-115%	
Zinc	ug/L	500	505	101%	85-115%	
Nickel	ug/L	500	502	100%	85-115%	
Iron	ug/L	500	503	101%	85-115%	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 12-7405 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0.04	500	500	544	529	109%	106%	75-125%	
Copper	ug/L	1.8	500	500	467	465	93%	93%	75-125%	
Lead	ug/L	0	500	500	508	495	102%	99%	75-125%	
Zinc	ug/L	62	500	500	627	617	113%	111%	75-125%	
Nickel	ug/L	3.4	500	500	505	502	100%	100%	75-125%	
Iron	ug/L	15	500	500	518	540	101%	105%	75-125%	



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QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

METHOD BLANK

Associated Lab Samples: L12-0001-7405

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	1.97	5	12/4/12	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	100	101.6	102%	85-115%	

LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	100	99.7	100%	85-115%	

LABORATORY SAMPLE DUPLICATE 12-7405

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO ₃	178.6	179.6	101%	85-115%	

pH SM4500-H+E Results QC Limits Lab Standard Number

ICV Buffer 7.00	7.00	6.95-7.05	L11-0002-0121
ICV Buffer 4.00	4.00	3.95-4.05	L12-0002-0046
ICV Buffer 10.01	10.01	9.96-10.06	L12-0002-0047
CCV Buffer 10.00	10.06	9.96-10.06	L11-0002-0122
CCV Buffer 4.05	4.02	3.95-4.05	L12-0002-0048

Slope 98.0% 90-102%



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QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAPH 300.0

METHOD BLANK MATRIX: Water

Associated Lab Samples: L12-0001-7405

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	11/30/12	

MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME:

Parameter	Units	Results	MS Spike Conc	MS Results	MS % Rec	Rec Limits	Qual
Sulfate 12-7405	mg/l	8.4	4	12.3	98%	75-125	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/l	5	4.3	86%	85-115	



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QUALIFIERS**SEMO PROJECT****DEFINITIONS**

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
A	1/100 Dilution
FS	Filtered Samples prepared in the field.

ANALYTE QUALIFIERS

- H** Analysis conducted outside the EPA method holding time.
M Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
R RPD value was outside control limits.

NES Not enough sample.

Method	Analysts
200.7	TLL
Alka	MM
IC	TLL

Report Acceptance	
QAO	Date
GWP	12/7/2012
Manager	Date
EJS	12/7/2012